

Date: 12/6/2012

California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2009
1	NAEMS: Dairy Emissions				

Project Name
National Air Emissions Monitoring Study (NAEMS): Air Emissions from California Dairies, Part I (NAEMS CA5B)
Project Description
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	Ag Air Research Council (AARC)	\$250,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
Interim site data: http://www.epa.gov/airquality/agmonitoring/data.html

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	May 2009
2	Dairy Emissions				

Project Name
National Air Emissions Monitoring Study (NAEMS): Air Emissions from California Dairies, Part II (NAEMS CA5B)
Project Description
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	ARB	\$40,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Y. Zhao	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
Interim site data: http://www.epa.gov/airquality/agmonitoring/data.html

Related info 1
Related info 2

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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	May 2009
3	NAEMS: Dairy Emissions				

Project Name
National Air Emissions Monitoring Study (NAEMS): Air Emissions from California Dairies from California Dairies, Part III (NAEMS CA5B)
Project Description
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	CDFA	\$70,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Y. Zhao	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
Interim site data: http://www.epa.gov/airquality/agmonitoring/data.html

Related info 1
Related info 2

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**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2012
4	NAEMS: Dairy Emissions				

Project Name
National Air Emissions Monitoring Study (NAEMS): Air Emissions from California Dairies, Part IV (NAEMS CA5B)
Project Description
Accurately assess emissions from livestock operations and compile a database for estimation of emission rates, promote a national consensus for emissions-estimation methods/procedures from livestock operations. Includes monitoring of VOCs and GHG emissions at a commercial dairy using open-path Fourier transform infrared (OP-FTIR) analyzer

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	UC Davis, College of Ag and Env'al Sciences	\$40,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Y. Zhao	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
Interim site data: http://www.epa.gov/airquality/agmonitoring/data.html

Related info 1
Related info 2

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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	May 2010
5	Dairy Emissions				

Project Name
Process-Based Farm Emission Model to Estimate Air Emissions from California Dairies, contract 05-344
Project Description
Using biological principles and engineering studies, develop a feed/waste stream process-based dairy farm emission model for VOC emissions.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Zhang	UC Davis	ARB	\$299,191
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner	UC Davis	UC Davis	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
A. Goldstein	UC Berkeley	UC Berkeley	

Report Location

Related info 1
http://www.arb.ca.gov/research/apr/past/05-344.pdf
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
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916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	January 2007
6	Dairy Emissions				

Project Name
Dairy Air Quality Monitoring of ROG and Ammonia in the Central Valley of California
Project Description
Maintain staffing and supplies for field and laboratory work to continue the ARB funded ROG project ID 55.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	CSU Agricultural Research Initiative	\$208,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	ARB	\$104,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno	SJVAPCD	\$104,000

Report Location
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_008799.pdf

Related info 1
http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf
Related info 2
http://www.epa.gov/ttn/chief/conference/ei14/session1/goorahoo_pres.pdf

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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2008
7	Dairy Emissions				

Project Name
Evaluating Dairy Ammonia, Methane, and Hydrogen Sulfide Emissions Using Tunable Diode Lasers

Project Description
Develop real-time methods for evaluating process and time specific emission profiles for NH₃, CH₄, and H₂S at dairies. A program to monitor ammonia emissions using the USEPA Emission Isolation Flux Chamber began in 2006 and continued through 2008. [No updates since 2006.]

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
D. Goorahoo	CSU Fresno	CSU Agricultural Research Initiative	\$98,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Krauter	CSU Fresno	ARB	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno	Boreal Lasers	

Report Location

<http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf>

Related info 1

<http://www.4cleanair.org/Documents/APCODetermination.pdf>

Related info 2

Abstract on page 9 at this site:
<http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf>

Please provide project updates and corrections to:
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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	May 2009
8	Dairy Emissions Mitigation				

Project Name
Dairy Operations: An Evaluation and Comparison of Baseline and Potential Mitigation Practices for Emissions Reductions In the San Joaquin Valley (Contract No. 04-343)
Project Description
Project is designed to obtain data needed to better estimate baseline dairy emissions and to estimate the emission reductions achievable with available control technologies.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	ARB	\$250,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	possible matching funds - CSUS Fresno Agricultural	\$250,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno		

Report Location
Report - http://www.arb.ca.gov/research/apr/past/04-343.pdf ; Abstract - http://www.arb.ca.gov/research/abstracts/04-343.htm

Related info 1
http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf
Related info 2
Continuation of previous work

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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2006
9	Dairy Emissions Mitigation				

Project Name
Air Emission Mitigation Techniques and Technologies for California Dairies
Project Description
Evaluate dairy PM10, 2.5, VOC, and ammonia emission mitigation practices for potential effectiveness. Includes lagoon and corral areas.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	Merced County via SWRCB and UC matching	\$600,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
R. Zhang	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
P. Robinson	UC Davis		

Report Location
http://www.arb.ca.gov/ag/caf/FrankMitloehnerDairySymposiumOct06.pdf

Related info 1
Project objective described in PowerPoint at: ftp://ftp.arb.ca.gov/carbis/ag/agadvisory/mitloehner05jan26.pdf
Related info 2
SJVAPCD Aug. 2005 VOC Emission Factors for Dairies, http://www.4cleanair.org/Documents/APCODetermination.pdf

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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2005
10	Dairy VOC Emissions				

Project Name
Volatile Organic Compound (VOC) Emissions from Cows Fed Typical California Rations
Project Description
Measurements of alcohols, volatile fatty acids, phenols, and methane (CH ₄) emitted from nonlactating (dry) and lactating dairy cows and their manure under controlled conditions. The experiment was conducted in an environmental chamber that simulates commercial concrete-floored freestall cow housing conditions. The fluxes of methanol, ethanol, and CH ₄ were measured from cows and/or their fresh manure.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	US EPA	\$75,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
B. Flocchini	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
P. Robinson	UC Davis		

Report Location
Not Available

Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2
UCD Dairy Air Quality Symposium presentation 10-11-06 available at: http://www.arb.ca.gov/ag/caf/FrankMitloehnerDairySymposiumOct06.pdf

Please provide project updates and corrections to:
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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2007
11	Dairy Emissions Mitigation				

Project Name
Effects of Liquid Dairy Manure Aeration on Air Quality and Nutrient Cycling
Project Description
This project will evaluate the air and water emission mitigation effects of a wastewater treatment technology for California dairies to determine whether/to what extent aerobic treatment systems can cost-effectively reduce environmental impacts associated with manure storage.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Collar	UCCE - Kings County	UC ANR	\$30,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. McGarvey	USDA - ARS	UCCE	

Report Location
Paper is presented in the book, "Dairy Manure Management: Treatment, Handling, and Community Relations". Available for \$42 at: http://www.nraes.org/nra_order.taf?_function=detail&pr_id=48&_UserReference=8429860989D767704899E01F

Related info 1
Related info 2

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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2006
12	Dairy Waste				

Project Name
Characterization of Dairy Waste Management Strategies with Regard to Pathogens and Air Quality
Project Description
Examine the effect that aerobic and anaerobic treatments have on the microbiological and chemical properties of waste.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	USDA - ARS	\$30,300
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
R. Zhang	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
Abstract available at: http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=195211

Related info 1
Related info 2

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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
13	Dairy Emissions	In progress	September 2009

Project Name
Estimating and Reducing Air Emissions from Dairy Feeding Operations
Project Description
Identify and measure VOC sources in dairy feed operations

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	USDA - CSREES	\$278,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
R. Zhang	UC Davis	USDA - ARS	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
C. Krauter	CSU Fresno	CSU Fresno	

Report Location
Several study presentations, see below; no final report located.

Related info 1
http://www.ag.iastate.edu/wastemgmt/Mitigation_Conference_proceedings/CD_proceedings/Animal_Housing-Treatment/Calvo-Freestall_housing.pdf

Related info 2
http://www.airquality.nrcs.usda.gov/AAQTF/Documents/200809_201008/200905_FresnoCA/01_Zhang_AAQTF_200905.pdf

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**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2008
14	Dairy Nutrient				

Project Name
Nutrient Balances in California Dairy Herds
Project Description
Data from 51 randomly selected dairy farms in Merced County, in California's Central Valley, was used to evaluate the impact of minerals in drinking water on nutrient balances and to characterize the mineral composition of manure from lactating dairy cows.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
A. Costillo	UCCE Merced	UC ANR	\$40,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
D. Bacon	UCCE Tulare		

Report Location
http://californiaagriculture.ucanr.org/landingpage.cfm?article=ca.v061n02p90&abstract=yes

Related info 1
Related info 2

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jspencer@arb.ca.gov
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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	March 2008
15	Dairy Emissions				

Project Name
Effects of Dietary Rumensin® on GHG and VOC Emissions from Lactating Dairy Cows
Project Description
Feed additives, like monensin sodium (monensin), have been thought to improve cattle health and productivity, and have been used for these reasons for decades. industry is the impact the dairy industry has on the environment. A main environmental concern associated with the dairy industry is the emission of volatile organic compounds (VOC) and greenhouse gases (GHG).

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	Eli Lilly-Elanco	\$50,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
E. DePeters	USDA-ARS		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. MacGarvey	USDA - ARS		

Report Location
http://www.extension.org/pages/Environmental_Responses_to_Dietary_Monensin_in_Lactating_Dairy_Cows

Related info 1
Hamilton, S.W., E.J. DePeters, J.A. McGarvey, J. Lathrop, and F.M. Mitloehner. 2010. Greenhouse Gas, Animal Performance, and Bacterial Population Structure Responses to Dietary Monensin Fed to Dairy Cows. J. Environm. Qual. 39:1-9

Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
16	Dairy Air Quality	In Progress	May 2010

Project Name
Western Region Dairy Odor and Air Quality Education
Project Description
The goal of this Professional Development Program grant is to reduce the environmental impacts of dairy farming in the West as a way to promote and guarantee the sustainability of the milk and cheese industries. The grant recipients plan to train agricultural professionals, selected from around the dairy producing areas of the Western region, on the best management practices available to dairy producers to mitigate the degradation of air quality. Four hands-on workshops will be conducted,

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
P. Ndegwa	WSU	USDA - SARE	\$89,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mittloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Sheffield	Univ. of Idaho		

Report Location

Related info 1
Other researchers from NM State (R. Hagevoort) and OSU (M. Gamroth)
Related info 2

Please provide project updates and corrections to:
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jspencer@arb.ca.gov
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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Draft Report	Estimated Completion Date	2010
18	Steer Emissions				

Project Name
Volatile Organic Compound and Greenhouse Gas Emissions from Growing and Finishing Feedlot Steers and Their Waste
Project Description
To quantify volatile organic compounds (alcohols, volatile fatty acids, amines, and phenols) and greenhouse gas (methane, nitrous oxide, and carbon dioxide) emissions from receiving, growing and finishing feedlot steers (enteric fermentation) and fresh waste using environmental chambers at UC Davis.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	California Cattlemen Assoc.	\$169,590
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
S. Trabue	USDA - ARS	California Feeder Council	\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
		ARB/CCOS	\$10,000

Report Location
Report submitted for publication

Related info 1
Costs to be split between the two funding sources
Related info 2

Please provide project updates and corrections to:
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Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Unknown	Estimated Completion Date	December 2006
19	Equipment Study				

Project Name
UC Equipment Matching Funds Program
Project Description
No description, but project cited at http://animalscience.ucdavis.edu/faculty/Mitloehner/pdf/Grants.pdf

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	UC Davis, Chancellor for Research	\$140,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

Related info 1
Related info 2

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**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	February 2009
20	Covered Lagoon Emissions				

Project Name
Covered Lagoon Digester Emission Measurements
Project Description
Measurements of NH3, methane, and VOCs at dairies with CEC funded dairy digester installations. Evaluates the Dairy Power Production Program (DPPP). The DPPP was initiated to encourage the development of biologically based anaerobic digestion and gasification ("iogas") electricity generation projects on California dairies.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
P. Sousa	WURD		\$500,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
M. Summers	Summers Consulting		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
http://www.energy.ca.gov/2009publications/CEC-500-2009-009/CEC-500-2009-009.PDF

Related info 1
Related info 2

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**California Air Resources Board
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Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	July 2005
22	Dairy PM, NH3 Sources				

Project Name
Agricultural sources of PM10 and ozone precursors
Project Description
Compile PM10 and NH3 emission factors. Measure concentrations of VOC relevant to to ozone formation upwind and downwind of dairies

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Flocchini	UC Davis	USDA	\$374,145
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Parnell	Texas A&M		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Higashi	UC Davis		

Report Location

Related info 1
http://www.reeis.usda.gov/web/crisprojectpages/192080.html
Related info 2

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**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2007
23	Dairy Emissions Modeling				

Project Name
Developing a Process Based Model for GHG for California Dairies
Project Description
Using biological principles and mass balance, develop a cradle-to-grave emissions model to provide greenhouse gas emissions estimates for dairies.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	CEC PIER	\$119,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Salas	Applied Geosolutions, LLC		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Zhang	UC Davis		

Report Location
http://www.arb.ca.gov/research/rsc/2-25-10/feb10adv.pdf

Related info 1
Funded with \$500,000 total - \$119,00 for Mitloehner portion
Related info 2
http://www.westerndairies.org/2009symposium/Mitloehner.pdf

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**California Air Resources Board
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Project ID	Project Type	Status	Completed	Estimated Completion Date	2005
24	Ammonia Modeling				

Project Name
Development of a Process-Based Ammonia Model for Livestock Sources
Project Description
Develop a process-based model of ammonia emissions from five types of animal feeding operations: dairy, beef, swine, chicken, and turkey.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
G. Tonnesen	UC Riverside	LADCO	\$250,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Z. Wang	UC Riverside		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Zhang	UC Davis		

Report Location
http://www.epa.gov/ttnchie1/conference/ei14/session1/mansell.pdf

Related info 1
Other researchers - J. Fadel, R. Zhang, G. Mansell, J. Haasbeek.
Related info 2
Abstract on page 9 at: http://www.epa.gov/ttn/chief/conference/ei14/final2005.pdf

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**California Air Resources Board
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Project ID	Project Type	Status	Completed	Estimated Completion Date	March 2005
25	Dairy Air Quality				

Project Name
Development of an Air Module Curriculum for the California Dairy Quality Assurance Program (CDQAP)
Project Description
Develop curriculum to assist producers in meeting the new air quality permit requirements

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	US EPA	\$50,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Meyer	UC Davis, CDQAP		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
M. Payne	CDQAP		

Report Location
http://www.cdqa.org/reports/annual_report_2005.asp

Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2

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**California Air Resources Board
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Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2005
26	Dairy Ammonia Emissions				

Project Name
Laser-based Sensors for Monitoring Ammonia Emissions
Project Description
A trace-gas sensor based on fibre-amplifier enhanced photoacoustic spectroscopy has been developed for measuring ambient ammonia in agricultural settings. Field testing was performed in environmental chambers at UC Davis where the excreta from three Holstein cows were allowed to accumulate, providing a source of ambient ammonia.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Patel	Pranalytica, Inc.	USDA - SBIR I	\$20,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
http://www.pranalytica.com/pdf/MST-16-1547-2005.pdf

Related info 1
\$79,000 total; \$20,000 for Mitloehner portion
Related info 2
Institute of Physics Publishing, Meas. Sci. Technol. 16 (2005) 1547-1553

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916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2006
27	Dairy Ammonia Emissions				

Project Name
Laser-based Sensors for Monitoring Ammonia Emissions
Project Description
A trace-gas sensor based on fibre-amplifier enhanced photoacoustic spectroscopy has been developed for measuring ambient ammonia in agricultural settings. Field testing was performed in environmental chambers at UC Davis where the excreta from three Holstein cows were allowed to accumulate, providing a source of ambient ammonia.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Patel	Pranalytica, Inc.	USDA - SBIR II	\$75,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
http://www.pranalytica.com/pdf/MST-16-1547-2005.pdf

Related info 1
\$350,000 (\$75,000 for Mitloehner portion)
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	July 2005
28	Pig Study				

Project Name
Effect of Atmospheric Ammonia on Pig Welfare
Project Description
Trace-gas sensor based on fibre-amplifier enhanced photoacoustic spectroscopy has been developed for measuring ambient ammonia in agricultural settings. Field testing was performed in environmental chambers at UC Davis where the excreta from three Holstein cows were allowed to accumulate, providing a source of ambient ammonia.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	National Pork Board	\$40,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
http://www.aasv.org/shap/issues/v15n3/v15n3p137.pdf

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	September 2011
29	Dairies				

Project Name
Respiratory Exposures and Health of Workers on California Dairies (NIOSH)
Project Description
Monitor exposures of 200 dairy workers at large dairies to dust and ammonia to define the concentrations of any airborne pollutants highly associated with respiratory problems.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	NIOSH	\$1,700,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
M. Schenker	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
D. Bennett	UC Davis		

Report Location
http://factsreports.revues.org/492

Related info 1
UC Davis' program - CA Dairy Environ Health Research Initiative (Cal-DEHRI)
Related info 2
Field phase in progress, June 2008

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	February 2006
30	Ozone Impacts				

Project Name
Investigation of Atmospheric Ozone Impacts of Selected Pesticides
Project Description
Develop methods for estimating and quantifying ozone impacts for selected pesticide compounds for which such estimates are not currently available.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
W. Carter	UC Riverside	ARB	\$100,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
I. Malkina	UC Riverside		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
Report of Jan. 10, 2007 available at: http://www.arb.ca.gov/research/apr/past/04-334.pdf

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	August 2008
31	VOC Emissions				

Project Name
Agricultural Pesticide VOC Sources and their Photochemical Ozone Formation Potential
Project Description
Improve current understanding of the photochemical O3 formation potential of VOCs from agricultural pesticide applications in the San Joaquin Valley.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Flocchini	UC Davis	USDA	\$400,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
R. Higashi	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
M. Kleeman	UC Davis		

Report Location
http://www.reeis.usda.gov/web/crisprojectpages/204179.html

Related info 1
http://airquality.ucdavis.edu/pages/events/2008/green_acres/GREEN.pdf
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2005
32	Fumigation				

Project Name
Commercialization of Intermittent Water Sealing
Project Description
Identify optimal water management strategies for water sealing commercial-scale application of fumigants.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
D. Sullivan	Sullivan Environmental	USDA	\$78,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
H. Ajwa	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. Radewald	UC Davis		

Report Location
http://www.sciencedirect.com/science/article/pii/S0045653508003913

Related info 1
http://mbao.org/2005/MBAO%202005%20pdfs/Preplant/8/Sullivan.pdf
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2005
33	Soil Ammonia Emissions				

Project Name
Improved Statewide Estimates of Ammonia Emissions from Native Soils in California
Project Description
Develop California specific ammonia emission factors and modeling for native soils within California

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	ARB	\$200,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Potter	NASA Ames		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
S. Klooster	CSU Monterey		

Report Location
http://www.epa.gov/ttn/chief/conference/ei12/part/krauter.pdf (2003)

Related info 1
http://geo.arc.nasa.gov/sge/casa/regional/california.html
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2005
34	Crop ammonia Emissions				

Project Name
Monitoring of Ammonia Emissions from Crop Production With a Tunable Diode Laser
Project Description
Evaluate the use of a TDL system for the determination of ambient ammonia levels and ammonia emissions from specific agricultural operations.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	CSU Agricultural Research Initiative	\$296,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	ARB	\$148,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno	Unisearch	\$148,000

Report Location
Partial, 2005 EPA conference. http://www.epa.gov/ttn/chief/conference/ei14/index.html (search Krauter)

Related info 1
http://www.epa.gov/ttn/chief/conference/ei14/session1/goorahoo_pres.pdf
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
35	PM Emissions	Drafting Final Report	Dec. 2012

Project Name
Cotton Gin PM Emissions Research, contract 09-01PM
Project Description
Evaluate the accuracy of US EPA's sampling methods which may significantly over-estimate PM emissions (CTM-039, P 2.5 Stack Sampling Method). Develop PM dispersion models for PM10, PM2.5, total suspended particulates (TSP). Characterize particle size, shape. Six test sites, 1 in CA.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
D. Whitelock	ARS - SW Cotton Ginning Research	Various cotton industry and ginners associations	\$147,500
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
M. Buser	OK State Univ.	ARB	\$45,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
C. Boykin	Cotton Ginning Research Unit,	SJVAPCD	\$36,000

Report Location
Quarterly reports submitted during research phase

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In Progress	Estimated Completion Date	2011
36	PM Emissions				

Project Name
Particulate Matter Emissions from Raisin Harvest
Project Description
Compare PM emissions of raisin harvesting techniques: conventional tray, continuous tray, dried on vine.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Alex Alexandrou	CSU Fresno	USDA-NRCS	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Krauter	CSU Fresno	SJVAPCD	\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
S. Ashkan	CSU Fresno		\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Drafting Reports	Estimated Completion Date	2010
37	Emissions Mitigation				

Project Name
Testing to Determine Emissions Reductions Achieved by Lower Emitting Agricultural Practices
Project Description
Evaluation of control effectiveness of two SJVAPCD Conservation Management Practices for PM (conservation tillage and combined operations)

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
US EPA RARE Study		US EPA RARE	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
		USDA	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
		SJVAPSA	

Report Location
Draft report of Los Banos work is under reievw

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	October 2007
39	VOC				

Project Name
DPR Round-Robin VOC Study
Project Description
Determine ways to improve VOC emission estimates for solvents in pesticide formulations by comparing the emissions under field conditions to emissions seen in traditional TGA testing. Results showed more ozone production on the downwind side, but only slightly. Most of the VOC increase after spraying is NOT from the solvent being regulated but from EtOH in fuel. To decrease ozone, NOx reduction more important than VOC reduction.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
P. Green	UC Davis	USDA-CSREES	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
presentation at CDPR, date unknown: http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/voc_regional_ozone.pdf

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2009
40	Soil VOC Emissions Mitigation				

Project Name
Reducing Emissions of VOCs from Agricultural Soil Fumigation, ARB contract 05-351
Project Description
Original study plus extension: Develop estimates for cumulative and hourly emissions rates from laboratory, field plot and predictive models which will be compared to previous large-scale field experiments on several emission reduction strategies

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Scott Yates	UC Riverside	ARB	\$200,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Jay Gan	UC Riverside	USDA-ARS	\$100,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
M. Majewski	UC Riverside		

Report Location
http://www.arb.ca.gov/research/apr/past/05-351.pdf

Related info 1
ARB agreement 05-351
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	August 2001
41	Dairy & Feedlot Emissions				

Project Name
Sources and Sinks of PM10 in the San Joaquin Valley
Project Description
Evaluate on-field PM10 emissions. Evaluate PM10 and ammonia emissions for feedlots and dairies.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Flocchini	UC Davis	USDA	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
T. Cassel	UC Davis		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
http://www.arb.ca.gov/research/apr/reports/l2022.pdf

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2001
42	Ammonia Emissions				

Project Name
Statewide Inventory Estimates of Ammonia Emissions from Native Soils and Chemical Fertilizers in California
Project Description
Measure and model ammonia emissions from agricultural fertilizer application and natural soils. Report available at: ftp://ftp.arb.ca.gov/carbis/reports/l522.pdf

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	ARB	\$186,425
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Potter	NASA Ames	NASA Ames	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
S. Klooster	CSU Monterey		

Report Location
http://geo.arc.nasa.gov/sge/casa/california.html

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 1996
43	Dairy Emissions				

Project Name
Results of the Measurement of PM10 Precursor Compounds from Dairy Industry Livestock Waste
Project Description
Using environmental flux chambers, evaluate dairy ammonia and ROG emissions.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Schmidt	Consultant	South Coast AQMD	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf

Related info 1
http://www.aqmd.gov/rules/proposed/pr1127.html
Related info 2
http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	January 1995
44	Dairy Emissions				

Project Name
Results of the Measurement of Volatile Organic Compounds from Livestock Wastes
Project Description
Evaluate process specific VOCs from dairies in the Sacramento region.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Schmidt	Consultant	US EPA	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location

Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	January 2002
45	Dairy Waste Management				

Project Name
Survey Current Livestock Waste Management Practices in the South Coast Air Basin
Project Description
Evaluate manure management practices in the SCAQMD

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Egigian-Nichols	Tetra Tech Inc	South Coast AQMD	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
http://www.aqmd.gov/rules/support.html#r1127

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	March 2003
46	Waste Management				

Project Name
Literature Survey and National Programs, Livestock Waste Management Practices Survey and Control Option Assessment
Project Description
Literature survey of waste management and control options. http://www.aqmd.gov/rules/proposed/pr1127.html

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Egigian-Nichols	Tetra Tech Inc	South Coast AQMD	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
http://www.aqmd.gov/rules/support.html

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	March 2003
47	Waste Management				

Project Name
Identify Potential Waste Management Practices Reducing Ammonia and VOCs, Livestock Waste Management Practices Survey and Control Option Assessment
Project Description
Identify livestock practices to reduce emissions. http://www.aqmd.gov/rules/proposed/pr1127.html

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Egigian-Nichols	Tetra Tech Inc	South Coast AQMD	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
http://www.aqmd.gov/rules/support.html

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2003
48	Waste Management				

Project Name
Emissions of Particulate Matter and Ammonia from Cattle Feedyards and Dairies: a Texas-California Partnership
Project Description
Quantify the effects of water application and manure harvest frequency on PM and NH3 emission from dry lots housing beef or dairy animals (heifers).

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
B. Auvermann	TAMU CEC	National Center for Manure and Animal Waste	\$12,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Harman	TAMU CEC		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
D. Meyer	UC Davis		

Report Location

Related info 1
http://ag.arizona.edu/ANS/swnmc/Proceedings/2006/Auvermann_SWNMC2006.pdf
Related info 2
http://amarillo.tamu.edu/library/files/brent_auvermann_publications/conference_proceedings/preliminaryevaluation_18.pdf

Please provide project updates and corrections to:
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jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	May 2006
49	Dairy Emissions				

Project Name
Evaluating Dairy Process Emissions Using Flux Chambers
Project Description
Using environmental flux chambers at a working dairy, evaluate relative emission levels of individual process including lagoons, flush lanes, and corrals.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Schmidt	Contractor	ARB	\$50,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
		SJVAPCD	
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
Phase II Tech Memo at: http://www.arb.ca.gov/ag/caf/SchmidtDairyTestData2005.pdf

Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2
http://www.epa.gov/ttn/chief/conference/ei14/session1/schmidt.pdf

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916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2005
50	Dairy Emissions				

Project Name
Measuring Dairy Cow Emissions in an Environmental Chamber
Project Description
Place cows into an environmentally controlled chamber and evaluate speciated VOC emissions emitted directly from cows and from fresh waste products.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	US EPA	\$75,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
R. Flocchini			
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. Peters			

Report Location
Final Report May 31, 2006. http://www.arb.ca.gov/ag/caf/MitloehnerDairyChamberEmissions2006.pdf

Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2
J Environ Qual 37:615-622 (2008)

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	May 2006
51	Dairy Emissions				

Project Name
Volatile Fatty Acids, Amine, and Phenol Emissions from Cows and their Waste
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	ARB	\$200,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
S. Trabue	USDA ARS		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
J. Koziel	ISU		

Report Location
http://www.arb.ca.gov/ag/caf/MitloehnerDairyChamberEmissions2006.pdf

Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2
http://jeq.scijournals.org/cgi/content/full/37/2/615

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2004
52	Almond Harvest Emissions				

Project Name
Improvement of PM10 emission factors for almond harvesting
Project Description
Refine existing PM10 emission factors for almond harvesting. Estimates based on measured PM10 during almond sweeping and pick up.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Flocchini	UC Davis	Almond Board of California	
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Parnell	Texas A&M		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
http://caaques.tamu.edu/Publications/Publications/PU01107.pdf

Related info 1
http://asae.frymulti.com/abstract.asp?aid=20039&t=2
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	July 2007
53	Dairy VOC Emissions				

Project Name
Photochemical Ozone Formation Potential of Agricultural VOC Sources
Project Description
Some recent estimates predict that dairy cattle are second only to on-road vehicles as a leading source of ozone precursor emissions in California's San Joaquin Valley. The objective of this work was to directly measure the ozone formation potential from dairy housing.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
P. Green		USDA	\$300,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
F. Mitloehner			
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
R. Flocchini			

Report Location
http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VH3-4S0YXTM-2&_user=1928924&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_version=1&_urlVersion=0&_userid=1928924&md5=e020b1203499a23d500c0127b4460438

Related info 1
presentation at CDPR, date unknown: http://www.cdpr.ca.gov/docs/emon/vocs/vocproj/voc_regional_ozone.pdf
Related info 2
Alternate site for report: Go to http://dx.doi.org and enter "doi:10.1016/j.atmosenv.2008.02.064"

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	May 2005
54	Broiler Emissions				

Project Name
Measuring Broiler Emissions in Tunnel Ventilated Housing
Project Description
Emissions of PM10, ammonia and organic gasses were measured periodically during the 55 day poultry production cycle including 45 days of production and 10 days between broods.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
M. Summers	CDFA	California Poultry Federation	\$40,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Duke	Foster Farms		
PI 3	Affiliation PI 3	Fund Source 3	Amount 3

Report Location
http://www.arb.ca.gov/ag/caf/poulemisrpt.pdf

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	December 2005
55	Dairy ROG Emissions				

Project Name
Evaluating Dairy Reactive Organic Gas Emissions
Project Description
Chemically speciate ROG samples collected at dairies. Attempt to develop emission factors for dairies and some individually tested dairy processes. Further study continues in 2005-2008 (project IDs 6, 7, 8).

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
C. Krauter	CSU Fresno	ARB	\$100,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
D. Goorahoo	CSU Fresno	CSU Foundation	\$20,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
B. Goodrich	CSU Fresno		

Report Location
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_008799.pdf

Related info 1
http://www.4cleanair.org/Documents/APCODetermination.pdf
Related info 2
http://www.epa.gov/ttn/chief/conference/ei15/session6/beene.pdf

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
56	Dairy Waste Management	In progress	September 2008

Project Name
Dairy Wastewater Treatment Feasibility Study
Project Description
Assess the feasibility of applying standard wastewater treatment technology to the management of manure from cows in typical California dairies. EPA plans to incorporate this information into its on-going assessment of technologies for dairy manure management.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Trygve Lundquist	Cal-Poly SLO	US EPA	\$19,936
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
(When available) http://www.epa.gov/region09/ag/dairy/technologies.html

Related info 1
http://www.arb.ca.gov/ag/caf/dairypnl/dairypanel.htm
Related info 2
http://works.bepress.com/tlundqui/2/

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	June 2011
57	Soil VOC Emissions Mitigation				

Project Name
Reducing Emissions of VOCs from Agricultural Soil Fumigation: Comparing Emission Estimates from Simplified Methodology, ARB contract 07-332
Project Description
For a single soil, determine the extent to which laboratory and modeling studies can simulate field emission data. Extend the range of emission reduction strategies assessable in the field using the laboratory and modeling approaches. Variables under investigation include columns/furrows, with tarped/untarped, VIF vs. HPDE covered beds/furrows.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Scott Yates	USDA-ARS-Riverside	ARB	\$100,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Daniel Ashworth	USDA-ARS	DPR	\$50,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
http://www.arb.ca.gov/research/rsc/10-28-11/item4dfr07-332.pdf

Related info 1
ARB agreement 07-332
Related info 2
USDA project 5310-12130-008-05

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Draft Report	Estimated Completion Date	January 2010
58	VOC Emissions				

Project Name
Emission of GHGs Resulting from Greenwaste Composting
Project Description
Construct 5 windrows, monitor oxygen, pH, ammonia, nitrate, nitrite, nitric oxide, methane, hydrogen sulfide and moisture at the core of the windrows; collect emission flux samples using a isolation flux chamber and analyze samples for methane, carbon dioxide, nitrous oxide, and IVMNEOC for 100 days

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Fatih Buyuksonmez	UC San Diego	SJVAPCD	\$198,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	July 2010
59	NAEMS: Layer Emissions				

Project Name
NAEMS Project: Air Emissions from California Layer Farms (NAEMS CA2B)
Project Description
This project is for conducting a two-year measurement and monitoring of air emissions from a layer farm in CA. The emissions from two mechanically ventilated layer houses are measured. The houses have approximately 68,000 hens in cages. The measured emissions include ammonia, hydrogen sulfide, carbon dioxide, volatile organic compounds, total suspended particulates, PM2.5 and PM10. In addition, the detailed information and data are collected on ventilation, indoor and outdoor

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Zhang	UC Davis	Ag Air Research Council	\$199,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
Interim site data: http://www.epa.gov/airquality/agmonitoring/data.html

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	July 2010
60	NAEMS: Broiler Emissions				

Project Name
NAEMS Project: Air Emissions from California Broiler Farms (NAEMS CA1B)
Project Description
This project is for conducting a two-year measurement and monitoring of air emissions from a broiler farm in CA. The emissions from two mechanically ventilated broiler barns are measured. The two broiler barns house about 42,000 broilers in each chicken production cycle. The measured emissions include ammonia, hydrogen sulfide, carbon dioxide, methane, nitrous oxide, ethanol, volatile organic compounds, total suspended particulates, PM2.5 and PM10. In addition, the detailed information

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
R. Zhang	UC Davis	Ag Air Research Council	\$219,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
Interim site data: http://www.epa.gov/airquality/agmonitoring/data.html

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
61	Dairy N2O Emissions	In progress	February 2014

Project Name
Assessment of Baseline Nitrous Oxide Emissions in California Dairy Systems, Contract 09-325
Project Description
N2O emissions will be measured in silage corn systems of three dairy farms in Stanislaus County. The N2O flux will be measured intensively, using static chamber techniques. Annual N2O emissions will be calculated. The annual N inputs in the form of solid manure, lagoon water, and synthetic fertilizer will be accounted for to enable calculation of the fraction of applied N that was emitted as N2O, i.e., the system specific emission factor.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
William Horwath	UC Davis	ARB	\$300,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
		EDF	\$100,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
62	Soil NOx Emissions	In Progress	February 2014

Project Name
Determining NOx Emissions from Soil in California Cropping Systems to Improve Ozone Modeling, Contract 09-329
Project Description
This is an add-on component to the three on-going baseline nitrous oxide (N2O) monitoring efforts. The results of the study are expected to provide an estimate of NOx emissions from California's agricultural soils and ozone modeling input by including NOx emissions from the soil. See Project IDs 77, 78, 79, & 81.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
William Horwath	UC Davis	ARB	\$83,500
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
63	Ozone Emissions	In progress	May 2011

Project Name
Flux Measurements of Biogenic Precursors to Ozone and Particulate Matter in the Central Valley, Contract 06-329
Project Description
Develop BVOC simulation platform for central valley agricultural operations and test the modeling performance through ozone and aerosol nucleation event measurements. Micro-meteorological to landscape level emission flux measurement program for certain selected crops identified during the screening phase.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Allen Goldstein	UC Berkeley	ARB	\$400,003
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
John Karlik	UC Berkeley, Ag Extension		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
64	VOC Emissions	In Progress	June 2013

Project Name
Improving Regional Biogenic VOC Emissions Estimate Using an Airborne PTR MS Eddy Flux Measurement System, contract 09-339
Project Description
Collect regional concentrations data for the full suite of BVOC species, develop new land cover databases, with proper scaling methodology. The results of this project would strengthen ARB BVOC inventory and improve the modeling of ozone and aerosols in ARB SIP.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Allen Goldstein	UC Berkeley	ARB	\$400,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Alex Guenther	Natl Center Atm Research		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
Halfidi Jonsson	CIRPAS		\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Draft protocol	Estimated Completion Date	December 2010
65	Removing H2S from Biogas				

Project Name
Removal of H2S from Biogas and NOx from Engine Exhaust at a Dairy Digester Using Microwave Technology, contract #ICAT 0803
Project Description
The project will monitor the performance of the H2S removal system and the NOx removal system on the biogas powered engine at the Tollenaar Holsteins Dairy Farm. Anaerobic digester gas (biogas) is captured from a heated, mixed digester and used to fuel a 212 kW Guascor engine-generator. H2S is currently removed from the biogas using an aerated water bubbler system (Soloscrub).

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Mark Rawson	SMUD	SMUD	\$246,309
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Chang Cha	Cha Corporation		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
Dan Greenberg	Applied Filter Technology		\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2007
66	Fumigant Emissions				

Project Name
Reductions of Fumigant Emissions using Irrigation and Virtually Impenetrable Film (VIF)
Project Description
Reductions of Fumigant Emissions using Irrigation and Virtually Impenetrable Film (VIF) for 1,3-D, chloropicrin, methyl bromide

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Steve Fennimore	UC Davis	USDA-CSREES	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Husein Ajwa	UC Davis	Stawberry Commission	\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
http://www.agecon.ucdavis.edu/extension/update/articles/v9n5_3.pdf

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2006
67	Fumigant Emissions				

Project Name
Reductions of Fumigant Emissions using Irrigation and Virtually Impenetrable Films (VIF)
Project Description
Reductions of Fumigant Emissions using Irrigation and Virtually Impenetrable Films (VIF) for 1,3-D and Chloropicrin

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Thomas Trout	USDA-ARS		\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
S. Gao	USDA-ARS		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
http://www.epa.gov/osp/hstl/AgCon.proceedings_print.pdf

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2007
68	Fumigant Emissions				

Project Name
Reductions of Fumigant Emissions using Irrigation and Virtually Impermeable Films (VIF)
Project Description
Reductions of Fumigant Emissions using Irrigation and Virtually Impermeable Films (VIF) for 1,3-D, Chloropicrin and methyl bromide

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Husein Ajwa	UC Davis	UC Davis	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
http://www.ars.usda.gov/research/publications/publications.htm?SEQ_NO_115=185286

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2007
69	Fumigant Emissions				

Project Name
Reductions of Fumigant Emissions using Irrigation
Project Description
Evaluation of reductions in fumigant emissions using tarps; focus on 1,3-D.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Husein Ajwa	UC Davis	UC Davis	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
http://mbao.org/2008/035Ajwa.pdf

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
70	Emissions Modeling	In progress	May 31, 2014

Project Name
Calibrating, validating, and implementing process models for CA agriculture greenhouse gas emission estimation, ARB agreement 10-309
Project Description
Improve earlier attempts of companion projects to calibrate & validate N2O models for CA conditions and estimate N2O emissions for CA crop specific fertilizer levels, measure N2O flux and physical variables.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Changsheng Li	Univ New Hampshire	ARB	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
William Salas	Applied Geosolutions, LLC		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
71	N2O Emissions Mitigation	In Progress	March 31, 2015

Project Name
Evaluating Mitigation Options of Nitrous Oxide Emissions in California Cropping Systems, ARB Contract No. 11-313
Project Description
Evaluate alternative management practices with greatest promise of reducing annual N2O emissions while maintaining productivity in lettuce, corn and tomatoes. Proposed strategies are: targeting fertilizer types and timing of their application, delaying nitrification by using urease and nitrification inhibitors, spatially decreasing the concentration of applied N fertilizer, and modifying irrigation methods.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Martin Burger	UC Davis	ARB	\$400,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	September 2011
72	PM Emissions				

Project Name
MISTING: A Viable Conservation Management Practice For Reducing PM10 Generated by Disking
Project Description
Quantify and substantiate PM-reducing potential of an existing DCU misting apparatus attached to a common agricultural disk, as well as other variables such as temperature reduction of dust plume, emission factors, night farming

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Alex Alexandrou	CSU Fresno	USDA-NRCS	\$210,651
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
C. Krauter	CSU Fresno	ARI	\$420,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
S. Ashkan	CSU Fresno		\$0

Report Location
http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046764.pdf

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
73	PM Emissions	In Progress	2010

Project Name
Effects of sweeping depth on particulate matter emissions from almond harvest operations
Project Description
Evaluate the effects of sweeper depth on particulate matter (PM) emissions from sweeping and pickup operations

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Brock Faulkner	TAMU		\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
S. Capareda	TAMU		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
http://www.atmospolres.com/articles/Volume3/issue2/APR-12-024.pdf

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2009
74	PM Emissions				

Project Name
Improving PM10 Emission Factors for Almond Sweeping and Harvesting
Project Description
Update almond sweeping and harvesting emission factors using dispersion modeling

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Brock Faulkner	TAMU	Almond Bd of CA	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
B. Goodrich	Trinity Consultants		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
S. Capareda	TAMU		\$0

Report Location
Proprietary, Almond Board of CA

Related info 1
http://betalab.tamu.edu/Papers/Almond/AnnualReport2010.pdf
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2011
75	PM Emissions				

Project Name
Particulate matter emission factors for almond harvest as a function of harvester speed
Project Description
Evaluate reduction in almond harvesting PM for reducign harvester ground speed from 5 mph to 2.5 mph usign ISCST3 and AERMOD to back calculate emission rates

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Brock Faulkner	TAMU		\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
B. Goodrich	Trinity Consultants		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
V. Botlaguduru	TAMU		\$0

Report Location
Abstract: http://www.tandfonline.com/doi/abs/10.3155/1047-3289.59.8.943

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	2011
76	PM Emissions				

Project Name
Harvesting Equipment to Reduce PM Emissions from Almond Harvest Operations
Project Description
Compare emissions from new almond harvesting systems and retrofit abatement devices to emissions from a conventional harvester

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Brock Faulkner	TAMU	USDA-NRCS	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
		SJVAPCD	\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
Not available

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In Progress	Estimated Completion Date	2012
77	N2O Emissions				

Project Name
Fertilizer N2O Research, Assessment of Baseline Nitrous Oxide and Nitric Oxide Emissions in California Cropping Systems, ARB Contract No. 08-324)
Project Description
Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N2O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 78, 79 & 81.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
William Horwath	UC Davis	ARB	\$300,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
J. Six	UC Davis (CEC Funded)	CEC (+ \$25K match)	\$500,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
D. Goorahoo	CSU Fresno (CDFA Funded)	CDFA	\$150,000

Report Location
4-14-12: Draft Final Report: http://www.arb.ca.gov/research/rsc/05-11-12/item4dfr08-324.pdf

Related info 1
See Project ID 62, contract 09-329, which is an add-on to study nitric acid
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In Progress	Estimated Completion Date	2013
78	Soil NOx Emissions				

Project Name
Fertilizer N2O Research, Assessment of Baseline Nitrous Oxide and Nitric Oxide Emissions in California Cropping Systems (CEC Contract)
Project Description
Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N2O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 77, 79 & 81.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Johan Six			\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In Progress	Estimated Completion Date	Dec. 31, 2013
79	Soil NOx Emissions				

Project Name
Measuring and Modeling Nitrous Oxide Emissions from California Cotton and Tomato Cropping Systems (CDFA Contract)
Project Description
Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N2O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 77, 78 & 81.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Dave Goorahoo			\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In Progress	Estimated Completion Date	2015
80	Dairy Emissions Mitigation				

Project Name
Quantification of the Emission Reduction Benefits of Mitigation Strategies for Dairy Silage, ARB Contract No. 11-325
Project Description
Silage emissions include criteria pollutants (e.g. VOCs, NOx) and greenhouse gases. This project aims to quantify and model the effectiveness of various mitigation practices (such as maintaining a smooth pile face, storing silage in ag bags, etc.) on the various emissions species. Factors such as silage exposure surface area, temperature, air velocity, etc. will also be measured and analyzed.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
F. Mitloehner	UC Davis	ARB	\$400,000
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
Y. Zhao	UC Davis		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
P. Green	UC Davis		\$0

Report Location

Related info 1
Atmospheric Environment. 2010, 44:1989-1995; Atmospheric Environment. 2010, 44: 4172-4180; J. Environ. Qual. 2011, 40:1-9, Env. Sci. & Technol. 2010, 44: 2309-2314; Trans. ASABE. 2011, 53: 1-7
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In Progress	Estimated Completion Date	Dec. 31, 2015
81	Soil NOx Emissions				

Project Name
Assessment of Baseline Nitrous Oxide Emission in Response to a Range of Nitrogen Fertilizer Application Rates in Corn Systems (CDFA Contract)
Project Description
Researchers are coordinating study goals and methods on 4 separate studies to evaluate flux emissions of N2O using typical fertilizer practices for each crop. Work began in June 2009. Measuring nitrous oxide flux in tomato, wheat, lettuce, rice, vineyard, orchard and alfalfa systems to develop emission factors. See also Project IDs 62, 77, 78 & 79.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Martin Burger	UC Davis	CDFA	\$92,542
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
W. Horwath	UC Davis		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Completed	Estimated Completion Date	March 2012
82	Soil Nox Emissions Mitigation				

Project Name
Assessing practices and influencing policy to mitigate nitrous oxide (N2O) emissions from California Agriculture
Project Description

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Johan Six	UC Davis	Packard Foundation	\$0
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
M. Burger	UC Davis		\$350,000
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
W. Horwath	UC Davis		\$0

Report Location

Related info 1
www.energy.ca.gov/2008publications/.../CEC-500-2008-039.PDF
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	Estimated Completion Date
83	Soil Nox Emissions Mitigation	In Progress	June 2013

Project Name
Use of Walnut Biochar to improve soil properties and reduce N2O emissions
Project Description
Researchers are investigating the influence of biochar on the soil N cycle and carbon sequestration in a variety of crops. This study evaluates biochar from walnut shells applied to the walnut orchards as compost.

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
Johan Six	UC Davis	CEC	\$84,834
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
			\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
Preliminary: http://www.plantsciences.ucdavis.edu/Agroecology/Outreach/Walnut.html

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717

Date: 12/6/2012

**California Air Resources Board
Emission Inventory Branch
Summary of Agricultural Emissions Research in California**

Project ID	Project Type	Status	In Progress	Estimated Completion Date	Feb. 2014
84	Soil Nox Emissions				

Project Name
#Deleted
Project Description
#Deleted

PI 1	Affiliation PI 1	Fund Source 1	Amount 1
William Horwath	UC Davis	ARB	\$83,500
PI 2	Affiliation PI 2	Fund Source 2	Amount 2
M. Burger	UC Davis		\$0
PI 3	Affiliation PI 3	Fund Source 3	Amount 3
			\$0

Report Location
Description: http://www.arb.ca.gov/research/single-project.php?row_id=64853

Related info 1
Related info 2

Please provide project updates and corrections to:
Janet Spencer, Planning and Technical Support Division
jspencer@arb.ca.gov
916.324.2717